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FIRE SHAPES THE LANDSCAPE
Along the Apalachee Scenic Byway

by Patricia L. York

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ABSTRACT

AUTHOR: Patricia L. York
Resource Forester
Apalachicola National Forest
P.O. Box 579
Bristol, FL 32321
(904) 643-2282

TITLE: Fire Shapes the Landscape Along the Apalachee Scenic Byway

ABSTRACT: The natural communities along the Apalachee Scenic Byway are unique to any other National Scenic Byway in the United States. Native plants and animals throughout North Florida have evolved to depend on fire during the spring and summer months, approximately every one to three years. North Florida Indian and European cultures have adapted to natural and prescribed fire over the centuries.

In the spring of 1990 the Apalachicola Ranger District received many comments in response to our re-introduction of prescribed burning during the spring months. Comments ranged from having never seen so many flowers in bloom to concern over burning up ground nests of quail and nesting trees of the red cockaded woodpecker. Recreationists and local visitors of the Apalachicola National Forest understand that prescribed fire plays an important role in maintaining the Apalachicola National Forest. However, few are familiar with the historic role of fire in maintaining native Florida's plants, animals and human culture.

Florida is facing an ever growing population boom of 900 immigrants a day, many newcomers are from areas in the country where frequent fire is not part of the ecological system. Many of these people will settle adjacent to natural areas which have evolved so intimately with fire that the areas rely on this force to maintain them, hence the term pyric communities.

The National Forests of Florida and other land management agencies will face a challenge of maintaining Floridas' pyric communities while confronting social pressure against the use of a force that is little understood. This report consolidates literature about the history of the use of fire in North Florida. The story depicts the natural role of fire along the Apalachee Scenic Byway using maps and pictures so the user can identify dominant natural communities, their succession from lack of fire to their responses to seasonal fires. In addition, it ties past human reliance on natural fire to present human manipulation of fire.

The beauty of the Apalachee Scenic Byway lies in the *occurrence of fire*. The story is intended not only to stimulate awareness of the natural role fire plays in shaping the landscape along the Apalachee Scenic Byway, but also the importance of fire in the overall health of the ecosystems of North Florida.

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EXECUTIVE SUMMARY

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AUTHOR: Patricia L. York
Resource Forester
Apalachicola National Forest
P.O. Box 579
Bristol, FL 32321
(904) 643-2282

SUMMARY:

Project intent: The intent of the this project is to:

1. Identify the need to interpret the role of fire in shaping the landscape along the Apalachee Scenic Byway.
2. Consolidate scattered literature concerning the natural role of fire and the historic and current human reliance on it.
3. To inspire awareness and appreciation about the importance of fire in maintaining healthy and diverse Florida ecosystems and in shaping our culture through a story with maps and pictures.

Identifying the opportunity: The recent re-introduction of growing season fire (prescribed fire conducted between early April and late August) on pine flat and savannah natural communities adjacent to the Byway, stimulated hundreds of comments and questions from those who passed by. Many of these were campers, hikers, scientists, nature viewers, hunters, local residents, and Forest Service employees. Never before had the application of prescribed fire stimulated this much interest.

The population in Florida is growing by 900 new residents a day. Many of these people come from urban settings or from places where frequent fire was not part of the natural process which shaped the landscape. These new residents will be directly or indirectly affected by burning on the National Forest and other natural areas. The greatest challenge facing natural resource managers today is gaining the public's acceptance of using prescribed fire as a tool. This will only be possible by increasing the awareness of the importance of fire (and particularly growing season fires) in maintaining healthy ecosystems in Florida.

Local government officials have expressed interest in the development aspects of the Apalachee Scenic Byway. They want to draw business from outside of the community, however, they have concerns about the length of stay and do not want to risk any change in the existing character of the community. They consider the

interpretive plan for the Byway an avenue to express their concerns in the level of development. A self-interpreting approach to this project was developed with the local concerns in mind.

The Forest Service is in need of an interpretive plan for the Apalachee Scenic Byway. The Byway was designated in June of 1989 and a letter was received by the Washington Office stating the need for an interpretive plan within the first six months of designation. This project will serve as a basis for the master interpretive plan.

The beauty stimulated by growing season fire in the savannah and pine flat communities along the Byway was the main criteria in its nomination and acceptance as a Scenic Byway. Much of the beauty along the Byway can be appreciated without understanding the natural forces and conditions which are responsible. However, an introduction to the unique landscapes along the Byway and the forces that create their beauty can enhance a visitor's experience. The Forest Service has the unique opportunity to interpret the role of fire as the main theme of the Apalachee Scenic Byway. Visitors will be inspired to learn how the native plants and animals, and past and present human cultures along the Byway, have adapted to and continue to rely on this natural and mystifying force.

Approaching the problem: Several steps lead to selecting fire as the main theme for the Apalachee Scenic Byway.

Physical aspects: The beauty along the Byway lies on flat terrain, primarily in the foreground. The pine flats, flatwoods and savannahs have a subtle beauty which has adapted to thousands of years of frequent fires caused by lightning strikes during the spring and summer seasons. However, much of the beauty of the Byway is not evident until the visitor actually stops the car, takes a walk, and looks down among the wiregrass. Even then, unless there is some understanding of the rarity and rich biodiversity of these natural communities, their uniqueness cannot be fully appreciated. "Too often the visitor's actual experience falls short of what it could be because they miss a feature or misunderstand a practice or action" (Jones 1990).

Audience: Current Byway visitors who drove the Byway for recreation or while pursuing their occupation noticed the savannah prairies and pine flats to be particularly beautiful and full of flowers during the summer of 1990. Many inquired about these areas. Some of the people noticed the longleaf pine plantations were also burned during this season. Their impression was that the Forest Service intended to destroy them. Some people praised the Forest Service for re-introducing natural fire back into native lands which evolved depending on it. This interest in how the Forest Service used fire lead me to focus on the current users of the byway, the recreationists and occupationalists.

Through telephone surveys and personal interviews (Appendix D) I gathered information concerning people's perceptions about fire and its use in the National Forest.

Recreationists included: campers, hikers, hunters, fishermen, horse-back riders, and nature viewers. Occupationalists included: loggers, baiters, Forest Service employees, and naturalists.

The general perceptions about fire is positive. Many enjoy better access into the forest and enjoy the appearance of the new growth after a prescribed fire.

This product will apply to current and future adult audiences.

Social Issues: The mention of fire stimulates many different reactions in our society. Numerous scientific and social issues will be debated and studied as long as fire and humans interact on the planet. The following chart exemplifies a few of the current and future fire related challenges:

Social Fire Issues

	<i>Pros</i>	<i>Cons</i>
	Frequent prescribed fires reduce the chances of large, uncontrollable wildfires which could threaten housing developments and cause uncontrollable smoke and ash problems.	Smoke temporarily hinders view on highways in neighborhoods. Smoke aggravates respiratory illnesses and adds to air pollution. Ash may float into neighborhoods and land on cars and in pools. Fire managers aim to reduce smoke problems and the risk of escape by choosing specific weather conditions to conduct a prescribed fire.
	Spring prescribed fires causes flowering of many native plants helping them to reproduce. Native wildlife has adapted to centuries of frequent lightning-caused spring fires and has learned to rely on habitat created by them.	Smoke and ash are carried further with spring and summer prescribed fire. Smoke is more intense and requires careful planning. The weather is usually drier and may require more plow lines which create permanent scars in the landscape.

Literature search: Literature concerning natural communities in this part of Florida was very scattered. After several weeks of researching and consolidating applicable information about fire and its role in the natural communities and local cultures along the Byway, I took representative photographs and drew a map of the Apalachee

Scenic Byway and all of the adjacent natural communities which are maintained by fire.

Many of the Clemson Short Course topics served as a guide for developing the step by step process of defining the significance of the chosen topic from conceptualization through to the development of the story. Other references and aids in developing this project were interpretation guides and actual Scenic Byway Master Plans.

Recommendations: My recommendation to the Forest Service is to adopt "How Fire Shapes the Landscape along the Apalachee Scenic Byway" as the major theme for interpretation.

- Interpretation should focus on the relationship of fire to the natural environment and to human culture.
- The master interpretive plan should incorporate the needs of the local community, such as any road maintenance costs, etc.
- The devises used for interpretation, such as signing and kiosks, etc. on National Forest land should be consistent with the Roaded Natural Recreation Opportunity Spectrum, to blend in with the natural surroundings and be infrequently placed.

INTRODUCTION

The purpose of this Clemson Short Course project is to portray the role of fire in shaping the natural landscape as well as human culture along the Apalachee Scenic Byway through a story with maps and pictures.

More specifically, to:

1. Identify current users of the Apalachee Scenic Byway and discover their interest and knowledge about the role of fire.
2. Write a story about fire - the natural role of lightning, natural and cultural adaptations to fire, and fire's role in maintaining healthy ecosystems along the Byway.
3. Demonstrate through maps, photographs and descriptions various fire-maintained natural communities along the Byway which the user can follow and identify what they are seeing and discover the effects of seasonal prescribed fires.

The development of the theme of fire for the Apalachee Scenic Byway was not approached in a vacuum. Many interpretive themes were possible for this Byway. However, the Florida panhandle is unique in the historical occurrence of frequent fires every one to three years. This frequent occurrence of fire not only played a major role in dictating the plant and animal communities which exist on the land, but can also be readily interpreted because of the frequent cycle. The effects of fire are evident to the user at various stages which repeat themselves every three to five years. Frequent fire is responsible for the visual appearance of the about 80 percent of the Byway.

After the idea of developing a theme around fire occurred to me, I tested the interest level of current users through personal interviews and telephone interviews. Local community leaders had input into the level of development of the Byway. The recreation staff in the National Forests of Florida supervisor's office made suggestions in the project focus and development. Local environmental groups, co-workers, and specialists in the local area all played a large role in the development of the project from conceptualization to the text. The combination of the expertise, literature review, and the user's interest expressed in using fire as a major theme for the Apalachee Scenic Byway all helped to define and refine the scope and direction of this project.

LITERATURE REVIEW

Literature review was multi-faceted in developing this project. Gathering information about the relationship of fire to the natural communities, native flora and fauna, and history specific to this area was the first step.

Interpretive, marketing, and writing skills information from the Clemson Short Course and INFO South is incorporated into the development of the project.

Clemson Short Course class material was also used in developing the methods of identifying an audience, focusing on the audience in developing a product, and identifying the needs of recreation on a growing populace. Specifically, the following classroom topics were used:

- Marketing forest recreation: John Syme
- Cultural resources in forest management: Kent Schneider
- Sociological/psychological foundations of outdoor recreation: Cary McDonald
- Trends in outdoor recreation: Gina Mclellan
- Historical foundation (the style in which he told the story): Dick Costley.

Ecosystems of Florida (Abrahamson 1990) identifies the various ecosystems (natural communities) along the byway and the predicted natural fire frequency for these communities.

Growing Season Burning on the Apalachicola Ranger District (Carr and York 1990): the personal observations of the district botanist, Susan Carr: "The effects of growing season burning on the plants and communities (in savannahs, seepage bogs, and seasonally wet pine flatwoods) have been spectacular and dramatic. The most notable response to the burning has been the increased flowering of wiregrass. In the (spring and summer) burned areas, wiregrass has bloomed profusely; its golden, waist high seed heads gently swaying in the wind give the area the appearance of a tall grass prairie...Prior to growing season burning, a rare lily, *Hymenocallis henryae*, was known to occur in two locations on the district. The growing season fires stimulated this lily to bloom; subsequently, we found an additional 14 populations. Several new locations of Florida skullcap, (*Scutellaria floridana*) a species proposed for federal listing as 'threatened', were discovered after a June prescribed fire. Flowering of many other 'sensitive' plant species dramatically increased in response to the growing season burning (in 1990).

Population dynamics of a long-lived conifer, Effects of fire season on flowering forbs and shrubs in longleaf pine forests (Platt, et al), and *Seasonal effects of prescribed burning in Florida* (Robbins and Myers) all identify the role of fire on particular plants and plant communities, historical fire occurrence and thunderstorm days. They also identify adaptations of many pyric (fire-maintained) plants and their relationships to fire.

Kimbroughs' master thesis, *Norwood period sties in the Apalachicola National Forest, Florida* discusses how native indians from this period migrated from the flatwoods to the floodplain and then to the coast depending on the season. She reasons that native indians colonized in the flatwoods after the lightning season to enjoy a bountiful harvest of game and fresh berries, etc. In the fall, they traveled along the bottomland hardwoods of the larger river systems to the Gulf where they remained until the following summer when they began their migration again.

Regenerating longleaf pine naturally (Croker 1975), *Prescribed burning may enhance growth of young slash pine* (Johansen 1975), *Vegetative response to prescribed fire in a North Florida flatwoods forest* (Moore 1982), *Scheduling prescribed burns for hazard reduction in the southeast* (Sackett 1975), and *Prescribed burning in the South--Trends and regulations* (Wade 1990) elaborated upon the technical aspects of prescribed fire itself and its effects on slash pine response to prescribed fire and vegetation response to prescribed fire. Johansen found that slash pine stands can be successfully burned to reduce fuel loading and increase growth. However, extra care must be taken in setting parameters and meeting specific objectives of minimizing scorch. Moore found that woody understory coverage decreased and herbaceous coverage increased immediately after a prescribed fire.

Fire, Rx for health in Florida's natural areas (Dye 1989), *Florida wildlife habitat, the last 50 years* (Kautz 1990), *Florida Wetlands* (Means 1990), *Florida's National Forests: Our last chance* (Noss 1987), and *The natural role of fire* (USDA Forest Service 1989) are non technical articles which emphasize the importance of introducing prescribed fire back into the time when fire naturally occurred, during the spring and summer. They discuss various plants, plant communities, and wildlife species' dependence on fire during this time to stimulate flowering and to maintain a suitable habitat for their continued existence. They discuss the history of prescribed fire and fire suppression in our society and the effects that action has had on natural areas, wildlife, and our attitudes toward fire.

METHODOLOGY/ANALYSIS

This Clemson Short Course project will serve as a basic theme for the development of a master interpretive plan for the Apalachee Scenic Byway. The master interpretive plan for the Byway is a National Forest priority in accordance with Forest Service direction to write interpretive plans for all National Scenic Byways.

Methods used to determine whether an interpretive theme for the Apalachee Scenic Byway should focus on fire were: personal and telephone interviews with user groups; consultation with professionals and specialists in the fields of ecology, biology, recreation, and other related fields; consultation with National Forests of Florida recreation staff; consultation with local community leaders; and intuition.

Once the concept of fire was accepted and supported, an analysis of existing natural communities along the Byway and fire regime was conducted. Using National Forest stand maps, the forest type, age, and condition was recorded and mapped. From this information, I was able to make generalizations to consolidate similar features into three natural community classifications: pine flats and flatwoods, savannahs, and swamp or river systems. This resulted in a final map of the natural communities maintained by fire on National Forest land along the Byway.

A map seemed to be something which could be used in identifying the location of a particular natural community maintained by fire, but was not useful in visually understanding what the user could be looking at and why a particular natural community looked the way it did. Either photographs or drawings would serve in giving a visual depiction of the natural communities maintained by fire along the Byway. This led to taking black and white photographs of the various fire-maintained natural communities and describing the relationship of fire and any other special, fire-related feature. The black and white photos were then 'half-toned' for better resolution when photocopying.

The story about fire consolidated a multitude of scattered material about each of the natural communities along the Byway and their relationship to fire. Consolidation of the pre-historic and historic information specific to this area was also necessary. Some of the relationships of fire adaptations to the past and present cultures of the area are speculation due to lack of sufficient written information or lack of time to locate all of the historical documentation relating to fire and the culture of this area.

The development of this story about fire inspired my appreciation of the beauty and complexity of the ecosystems along the Byway, including the role of natural forces in maintaining biodiversity. It has enlightened my awareness of the mysterious effects of seasonal fire and the sometimes devastating effects of ignorant or intentional human intervention. Interest in understanding the relationship between nature and human existence is a desire of most people who have all of their basic needs met. The attempt to

understand more about where we came from is evident at some point in each of our lives. This short and in-depth study has heightened my awareness that land managers need to play more of a role in revealing the natural and cultural heritage of people to themselves.

FIRE SHAPES THE LANDSCAPE ALONG THE APALACHEE SCENIC BYWAY

The Role of Lightning

Before humans learned how to use and control fire, lightning fires ruled the Florida landscape. Florida has the greatest number of thunderstorm days in the United States, varying from 70 in the northeast part of the state to over 90 in the south (Robbins and Myers 1989). Most of the thunderstorm activity in Florida occurs in May and June (See Fig. 1 in Appendix D). Spring is also the time when most plants are producing leaves and flowers after winter dormancy. The plants absorb the first rains of the spring thunderstorms and leave very little water on the surface or in the ground to serve as a firebreak. As a result, fires started by lightning could travel across these otherwise natural firebreaks during this time of year (Dye 1989). Although thunderstorm activity occurs in July and August, the vegetation is not absorbing as much water as it needed in the spring of the year, leaving the natural drains wetter and able to act as natural fire breaks during these months. This may be one of the many reasons why fires burned across most of Florida during the spring of the year prior to European settlement.

As a result of thousands of years of frequent lightning fires during the spring of the year, the native plants and animals along the Byway have adapted to rely on fire in various ways. Wiregrass, for example, has evolved to flower and seed only after a fire during the growing season (between early April and late August). The red-cockaded woodpecker depends on a fire-maintained habitat. These are only two examples of how plants and animals have evolved to rely on natural forces, such as lightning-caused fires, for their existence.

The early indigenous people who occupied what is now the Apalachicola National Forest also adapted to lightning fires. It is believed that the prehistoric indigenous people practiced a 'seasonal round', moving to the coastal area when lightning fires threatened the inland, then returning to the inland during the summer and late fall to find the freshly burned grasslands and forest rich in the new growth of plant and animal life (Kimbrough 1990).

Natural Adaptations to Lightning Fires

Paradoxically, fire-adapted plants are extremely flammable. One of Florida's early explorers, Alvar Nunez Cabeza de Vaca wrote in 1542 "many of the standing trees were riven from top to bottom by bolts of lightning which fall in that country of frequent storms and tempests" (Robbins and Myers 1989).

"It is hypothesized that longleaf pine maintains its habitat in a state suitable for its own regeneration"(Platt 1987). What Alvar Cabeza de Vaca may have witnessed is an evolu-

tionary adaptation of longleaf pine to convert a lightning strike into a ground fire creating an environment where it is the only tree species best adapted to live.

Some of the fire-adapted characteristics of longleaf pine are:

- flammable needles which shed more frequently than other pines,
- wide spacing of adults which reduces the possibility of a destructive crown fire and,
- flammable pine resin in the stumps and boles of dead trees which can burn for days allowing any ground cover that did not burn the first time to re-ignite (Platt 1987).

Longleaf pine is one of the many plant species adapted to flourish in a community maintained by frequent ground fires occurring every one to three years. Wiregrass is especially adapted to carry a fire. Fire is carried by the flammable grass blades along this continuous ground cover until it meets a swamp or drain. This grass can propagate vegetatively when burned any time of the year; however, it evolved to produce seed heads only when burned during the growing season. The waist high, golden seed heads produced by growing season fires have turned the southern half of the Byway into a spectacular tall-grass prairie.

At a glance wiregrass may appear to be the only plant present in the pine flats and savannahs. However, a short walk and glance at your feet may reveal between 35 to 40 different kinds of plants within any three-foot by three-foot square area. So many of these plants are not only fire-adapted, but rely on wiregrass to carry the fire so that they can flower and produce seed.

A rare lily (*Hymenocallis henryae*) had only been known to occur in two locations on the Apalachicola National Forest. After a prescribed fire conducted in April, 1990, fourteen new populations were discovered in the savannahs and pine flats along the Byway! Florida skullcap is another example of a very rare plant which responded with the addition of hundreds of new individuals after a June prescribed fire.

The red-cockaded woodpecker (named for the very small red patch on the side of the head of the male) has such specific habitat requirements that this bird has been listed by the Fish and Wildlife Service as in danger of becoming extinct. Red-cockaded woodpeckers (RCWs) need very old and mature pines to nest in and an open understory to feed. RCWs are the only woodpecker to excavate cavities in live pine trees. Frequent fires keep the understory clear of shrubs and oaks which would otherwise grow freely. Without fire, shrubs and oaks can grow close to the cavity opening making it easier for competitors, such as the flying squirrel, to fly into and overtake the cavity.

Red rat snakes are adept tree climbers and prey on RCW eggs and young if able to get to them. It is hypothesized that RCWs peck around the cavity opening to create a sticky flow of pine pitch that keeps snakes and other tree climbers from reaching into the cavity. In the absence of fire, tall oaks and shrubs make it a short reach for the red rat snake to this tasty delicacy.

These are just a few of the many plants and animals which have been impacted by fire suppression or controlled fire outside of the growing season. In an article in the fall 1989 edition of the Florida Naturalist, Robert Dye describes Florida's rare and endangered plants and animals: "It should come as no surprise that most of the terrestrial animals and many of the plants that are recognized as threatened, endangered, or otherwise rare are constituents of Florida's pyric (fire-maintained) communities" (Dye 1989). Many of the animals and plants which cannot be found elsewhere because of urbanization, loss of habitat and fire suppression are found in the Apalachicola National Forest along the Byway.

Each of the different kinds of native plants and animals (or species) plays a unique and specific role in the ecosystem. Associated with the individual plant or animal species are the conditions and forces which lead to the adaptations of each. In the savannahs and pine flats along the Apalachee Scenic Byway, the physical conditions such as soil type, drainage (hydrology), and geology, and natural forces such as flooding, or lightning-caused fires in the spring of the year are all inter-related and played a role in the evolution of plants and animals which exist there. There are more different species of carnivorous plants in a three-foot by three-foot area in the savannahs than anywhere else in the world except Australia (Walker, per. com.). Not only the carnivorous plants, but the number of all of the different kinds of plants (called species diversity) in the savannah community is larger than anywhere else in the state of Florida.

Attempting to isolate the reasons why the savannah and pine flat communities have so many species of plants is difficult. Soils in savannahs are poor in nutrients, highly acidic, and poorly drained. It is interesting to note that "...most of the same families of plants are found in similar habitats around the world. In fact, carnivorous plants are located principally in seepage bogs (found along the edges of pine flats and savannahs) worldwide. These observations suggest that carnivory in plants is an ancient adaptation. It may have evolved in nutrient-deficient places early in the evolution of angiosperms (flowering plants), before the breaking up of the continents between 65 million and 125 million years ago" (Means 1990).

These are adaptations to adverse conditions in which plants have evolved to exist. Another adaptation of the savannah and pine flat flora along the Byway is their response to frequent spring fires. It is difficult to identify scientifically sound explanations explaining how entire plant and animal natural communities, or ecosystems, rely on a single force such as growing season fire. As time progresses; however, land managers work with scientists to learn more about these complex ecosystems. Learning more about ecosystems and the natural forces and conditions that maintains them, further exposes the impact of human actions. Even something seemingly insignificant such as altering the time of year to conduct a prescribed fire can have a significant ecological effect. It is estimated that 97 percent of the seepage bogs which stretched across the Gulf Coast only 200 years ago have been altered or destroyed by the actions of humans (Means 1990).

Past and Present Cultural Adaptations to Fire

Pre-historic indigenous people also adapted their life-styles to the frequent fires which raged across the Florida panhandle thousands of years ago. Rhonda Kimbrough, the National Forest Archeologist, wrote her masters thesis on Norwood Period Sites in the Apalachicola National Forest. The Norwood period begins roughly around 2000 B.C. and extends to 180 A.D. She believes that the people of that time period, and prior to that period, hunted and gathered for food. In July, sometime after most of the forest burned, the early hunters and gatherers of the Apalachicola National Forest could have set up camp in the pine uplands to take advantage of the abundance of game and berries on the freshly burned landscape. "As a result of summer fires, game would be attracted to renewed growth of vegetation and these game would be more easily hunted in a forest with freshly burned walkways" (Kimbrough 1990). In October and November, the hardwood floodplain along the rivers would dry out and hickory nuts and acorns would begin to fall. "These would be attractive to man as well as deer which could then be hunted for meat" (Kimbrough 1990). It is hypothesized that the indigenous people of this period could have moved from the pine flatwoods to the floodplain in the fall to take advantage of the abundant food and meat available. "Soon, however, the available vegetation would become dormant and the increasing rains would make wet inland site locations undesirable. However, fishes in nearby waterways would be available and the mullet near the coast would be full of roe" (Kimbrough 1990). Thus, these people could have moved their camps again from the floodplain to the coastal areas until after the spring fire season when they would continue their 'seasonal round' and move back to the freshly burned pine uplands.

Soils poor in nutrients was one of the reasons why the lands along the Apalachee Scenic Byway were probably not farmed by early Europeans and Indians between 1000 and 1800 A.D. Although small groups of Indians continued to hunt and gather food, the majority moved out of the Apalachicola National Forest area and into the "red hills" of lower Georgia and Northern Florida. Fire probably occurred naturally in this area although it is believed that Florida Indians did burn outside of the lightning season (Robbins and Myers 1989), probably to manipulate game.

After the 1800s manipulation of fire probably occurred more in different seasons and for different reasons than natural fire. Small portions of the forest along the Apalachicola River near Fort Gadsden were set aflame during the War of 1812 and the Civil War to clear vegetation to better see the enemy (Kimbrough, pers. com.).

After the Civil War, Europeans began settling near the town Sumatra. Folks who settled here probably used fire to clear land for building their homes, agriculture on a small scale, and raising cattle. Fire was also used by workers to burn the underbrush in mature longleaf pine stands for "turpentineing". Workers probably set fire to the forest to clear the ground for easier access from tree to tree, and to clear for snakes and insects. Many of the relic "cat-face" trees remain along the Byway from this wide-spread industry. The scars on the trees vary from one large, rectangular section of the bark missing on the tree to two sections rounded at the top of the scar. Thick, dried pine resin fills these once open

wounds. These are some of the oldest longleaf pine found on the forest. They were left as culls from the 1930's when most of the Apalachicola Forest was logged.

Logging during the 1920s and 1930s was the period when most of the panhandle of Florida was burned. Local folks here still remember when the Apalachicola National Forest was acquired. Most of the timber was gone and most of the land was burned. One of the first jobs of the Civil Conservation Corps was to plant thousands of acres back to pine in the late 1930s. This led to another problem for plants and animals which depended on fire for existence - especially those depending on growing season fire to flower.

With the introduction of slash pine with its susceptibility to fire, along with the belief that fire killed wildlife and destroyed forest values, natural-occurring wildfire was perceived as an enemy in the Apalachicola National Forest and was suppressed for the following 20 years. An additional duty of the Forest Service Civilian Conservation Corps at the office in Wilma was fire suppression.

In the early 1960s the Forest Service introduced a program of prescribed fire during the cool winter months to reduce the fuel load to lessen the chance of a catastrophic wild fire. The young slash pine plantations were protected by plowing a fireline around them. The winds are predictable during the winter and a cool ground fire can burn the needles, brush and grasses back safely. The grazing program was also introduced around this time. Burning during the winter months produced forage to sustain cattle through the winter months. As time progressed, the benefits of prescribed fire were becoming more widely known and accepted. The National Forest expanded its burning program to include burning to produce forage for wildlife (mostly during the winter), and burning small stands of longleaf pine plantations in May to kill a brown spot fungus. In the 1980s prescribed fires during the spring of the year were re-introduced to the savannahs. Now in the 1990s, the Forest Service is expanding its burning program to include several thousand acres to be prescribed burned only during the growing season. This attempt to use prescribed fire in the season which it naturally occurred has successfully stimulated flower and seed production in the savannahs, pine flats, and pine uplands along the Byway and received positive and negative responses from different members of the public.

Aside from the National Forest management applications of prescribed fire, some of the local people depend heavily on fire for additional income and for recreation. Grunting for worms is a popular business along the Byway. The spring and summer burns have caused a real increase in the number of people buying bait permits because of the higher price the bait brings during the peak fishing season. As the smoke rises higher into the air the Forest Service office receives dozens of phone calls from neighbors trying to find out the exact location of the ongoing prescribed fire. The ground barely cools before the "baiters" set foot on the freshly burned land. They proceed to take out their steel bar, place it on the ground, then rub a wooden stick against it creating a guttural vibration which can be heard for miles and felt within a 30-foot circle. The vibration causes worms to crawl to the surface where they can be easily seen and collected. Coffee cans full of 50 to 100 worms are sold to local markets for up to \$20 per can during this season.

Hunting is a popular sport on the National Forest. The hunting clubs and hunters understand the benefits of prescribed fire to stimulate forage for game animals. Many support the use of prescribed fire during the spring of the year because of the benefits of burning back the tall shrub titi from the flatwoods to create more annual grasses for deer and other game. Burning in the growing season also reduces the conflict of burning the ground during hunting season making it difficult for their dogs to track deer.

Never has the Apalachicola Ranger District heard more about the beauty along the Apalachee Scenic Byway than in the summer of 1990 when prescribed fire was used in the savannahs and pine flats and flatwoods along a 15 mile stretch. Scientists of various natural resource fields, campers, hikers, and many of the employees enjoyed watching the splendid color shows of the fields of flowers in the savannahs, and the prairie appearance of the flowering wiregrass.

There was a negative side too. Elly Pauly, the local newspaper author of "Sumatra Tidbits" was very upset that the Forest Service actually set fire to longleaf plantations and "burned up" the tax payers dollars. All of the needles of the longleaf burned off and the stem was left black. All of the grasses surrounding each tree were gone. The trees were dead. Those acres were destroyed. That is the perception that Smokey Bear and the Forest Service wants to leave behind. In fact, it was enlightening to read in Elly Pauly's column 1 month later that "...the longleaf pine seedlings were not dead, in spite of the fire". In fact, they were shooting out needles at a rapid pace. Flowers were blooming right beside the pines and the plantation looked tall and healthy. Maybe the next time Ms. Pauly sees a longleaf plantation burning during the growing season she will not be as alarmed and will wait for the fire resistant buds to send out new green needles.

That is merely one example of several common misconception about fire. One of the biggest social challenges facing all natural resource agencies in Florida today and in the future is gaining acceptance of the importance of fire from a growing population of 900 immigrants each day. Neighborhoods are being built adjacent to National Forest. More roads, airports, hospitals and schools increase the smoke hazard risk and fire complexity for prescribed fire managers. The following table lists some of the pros and cons of fire.

Fire: A natural process

Fire is a natural force which has played a role in Florida for over 10,000 years. Humans are now able to alter the effects of many forces of nature. I like to think of what the famous evolutionist, Dr. Steven J. Gould, said during his guest lecture in Tallahassee in 1990: "If our (human) existence depended on understanding *how* we evolved, we would not be here". The same can be said for the natural forces of nature. It will be years (if ever) before we understand why or how altering natural processes, such as fire, impacts the natural and human environment on earth. The Apalachee Scenic Byway is one of the special places left in Florida, where seasonal fires shape the landscape.

SUMMARY

Fire shapes the landscape along the Apalachee Scenic Byway. Developing a theme emphasizing fire for a master interpretive plan for the Byway involved surveying local user groups and local community leaders to discover their level of interest and acceptance about the use of fire. It incorporates a new National Forest outlook called New Perspectives which encourages managers, as land stewards, to try more natural approaches to land management. As more people migrate to Florida, lands adjacent to National Forests will become more populated. Future challenges face land managers using fire to maintain Florida's native wildlands. The need to interpret the use of fire on National Forest land is becoming critically important.

Identifying how to present the topic of fire and its relationship to the natural communities and cultural heritage in this specific area was accomplished in several steps. Many of the topics covered in the Clemson Recreation Short Course assisted me in identifying an audience, writing with the audience in mind, interpretive approaches - Tildens' six principles, and understanding the role of recreation and recreational opportunities on National Forest lands.

Consolidating material for the story involved locating written material about the local natural communities, the effects of fire on these communities, and the adaptations of local pre-historic and historic people to natural and manipulated fire.

Frequent fires shape over 80 percent of the National Forest land adjacent to the Byway. It was a critical component of the evolutionary system in shaping the existing natural communities and all of the native plants and animals which depend on them. Without fire, the lands along the Byway would not look like they do and many of the native plants and animals would not be able to live there. As a matter of fact many of the plants and animals which rely on fire-maintained systems are on many of the state and federal lists as endangered, threatened, or sensitive.

Florida is believed to have the greatest number of thunderstorm days in the United States. It is predicted that lightning-induced fires occurred frequently across the entire state. Many of the plants in North Florida flourish by using this natural disturbance - lightning-induced ground fires - to maintain an environment in which they are adapted to. Animals have also adapted to rely on fire-maintained habitats. The season in which fire occurs is critical for the flowering of certain plants. During the spring is when lightning-induced fires, not usually accompanied by rain, historically occurred in Florida. During the summer months thunderstorms occur along with lightning, however these storms are usually accompanied by rain. The length of the growing season is still in question. April through August is what the Forest Service Ecologist typically calls the growing season.

Pre-historic people adapted their lives to the season of fire. They lived in the coastal areas during the winter and spring when lightning fires burned most of the inland. Following the

spring fires they migrated to the freshly burned flatwoods, rich in flora and game. At the end of the summer, they migrated toward the floodplain to a bountiful harvest of acorns and game. As the floodplain vegetation dried, in early winter, they moved again to the coast to fish until the lightning-induced fire season passed when the 'seasonal round' began again.

The soils along the Byway are not rich in nutrients. This prevented them from growing crops at the time when the rest of Florida was farmed. Interspersed grazing by early European settlers was practiced on a small scale. Logging and resin collection had a major impact on the season in which fire was used. Workers would burn the forest for access to individual trees to collect pine resin. Most of the land was burned after logging to remove slash and debris which could cause a catastrophic wildfire.

Prescribed fire was introduced in the Apalachicola National Forest sometime in the early 1960s to reduce a buildup of dead vegetation (or fuel) from decades of fire suppression. Since the re-introduction of prescribed fire to reduce fuel load, many more applications have been discovered, including the use of prescribed fire during the spring and summer months to mimic the natural occurrence of fire in the natural communities that evolved to depend on it.

The impact of fire suppression is still largely unknown. Observation and research has been specific to one species or a single characteristic of several species rather than entire natural communities. It is difficult to study each of the many species of plants and animals within a natural ecosystem and derive management recommendations for that system. What we, as humans are beginning to learn is that the existence of natural systems is complex. The role of seasonal fires in maintaining diverse ecosystems is also complex. Accepting and respecting that these complex, natural systems exist and that fire plays an important role in maintaining their beauty and health is in the hands of all residents, visitors, and land stewards in the Florida panhandle. The Apalachee Scenic Byway is one of the special places left in Florida, where seasonal fires once again shape the landscape.

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APPENDIX A

APALACHEE SCENIC BYWAY MAPS



Cypress Swamps/ponds

--Among all of the different types of swamps along the byway, Cypress is the most recognizable. Cypress ponds and stringers, plus titi shrub bogs historically burn three to ten times in a century (Ewel 1990).

--It may be difficult to imagine this natural community ever burning at all. It is hypothesized that cypress seeds need bare ground to germinate. This may only occur after a ground fire burns the litter off of the forest floor during a period of drought.



River Swamps

--Bottomland floodplain forests and swamps historically experience a fire every 100 or 200 years (Ewel 1990).

--Seasonally wet forests provide an important component of diversity within the forest ecosystems.

--These wet swamps and drains act as havens for some critters that are temporarily displaced while a fire passes through portions of their home range, as in the case of bobwhite quail.

--Swamps and floodplains have plants and animals unique to that system. For the most part, the plants and animals in these systems are not adapted to living in a region dominated by frequent fire.

--These riparian habitats are important breeding grounds for neotropical migratory warblers and many reptiles and amphibians. They are also important feeding grounds for great blue herons, egrets, and other wading birds. A visitor may also encounter raccoons, river otters, bobcats, beaver, and white-tailed deer, as well as many other animals which rely on these seasonally wet habitats (Costa, pers. com.)

Pine Flatwoods

--Pine flatwoods are a little drier than pine flats. Palmetto is most noticeable after frequent winter prescribed fires (every three to five years) on these drier sites.

--The possibilities of seeing an abundance of wildlife in these slash or longleaf pine forests are great regardless of the season of the fire.

--White-tailed deer, fox squirrel, coyote, reptiles and countless other kinds of critters rely on a frequently burned forest floor to renew a fresh supply of grasses or insects associated with the new vegetation.

--Growing season (spring or summer) fires stimulate seed-production and synchronize flowering better than dormant season (fall or winter) fires (Platt 1988). However, a cool winter burn is necessary on National Forest to reduce a build up of several years of dead vegetation (or fuel) before introducing growing season fires.



Pine Flats or Flatwoods

--Without frequent fire to continually suppress many of the shrubs and hardwoods, they will colonize underneath the pines making it difficult for pine seeds to find bare ground to germinate. The pines will eventually be replaced by oaks.

--Grasses and flowering forbs are replaced by woody shrubs and trees. "As herbs and forbs are shaded out, insect populations change, vertebrates that eat these plants and insects decline, and in turn larger predators follow suit" (Dye 1989).

--This stand represents less than 1 million acres of longleaf pine forest left in Florida of 7.6 million acres which existed only 50 years ago (Krautz 1990). Much of the remaining 0.95 million acres of longleaf pine forest may look similar to this, due to a lack of fire.



The Effects of Fire on

*Natural Communities along the
Apalachee Scenic Byway*



Longleaf Pine Flats

--Most of the forest canopy along the byway consists of longleaf pine and/or slash pine trees. This longleaf pine/wiregrass flat has been prescribed burned frequently (every one to four years) during the spring.

--Wiregrass responds to spring fire by sending up waist-high flower stalks which turn a golden wheat-color as they mature. This grass appears to fill the forest leaving no room for anything else to grow. However, a short walk rather than a glance from the road will reveal some of the inconspicuous plants which also flower or seed best after frequent spring fires.

--The Forest Service Ecologist estimates the presence of 35 - 40 different kinds of plants in any 3-foot by 3-foot square area in the pine flats and savannahs (Walker, pers. com. 1991).

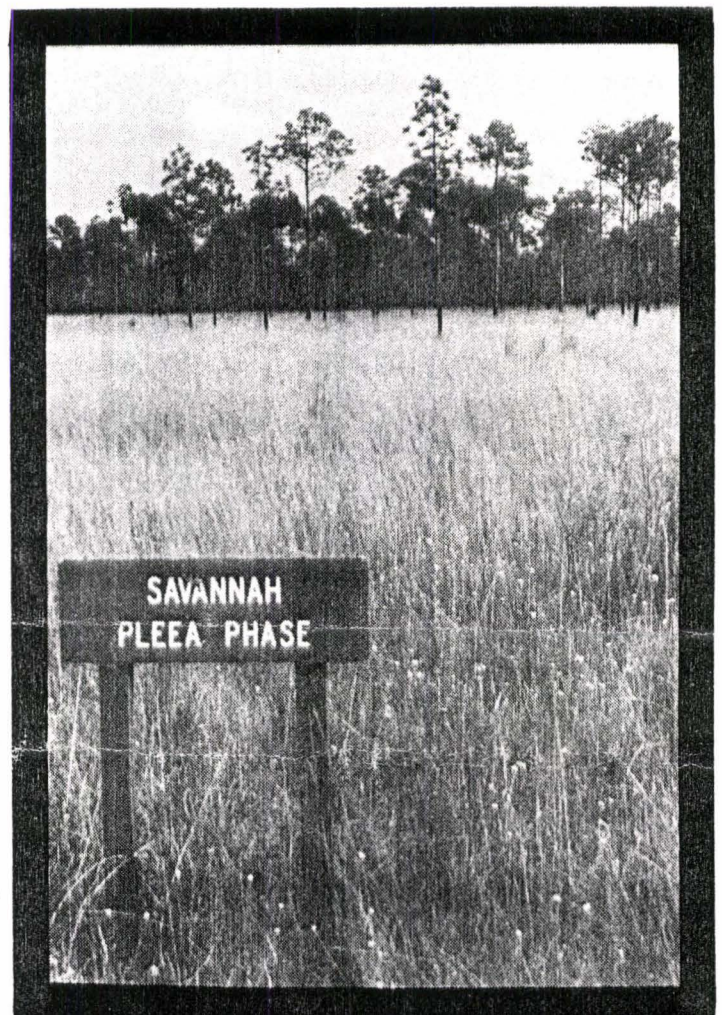
--An open understory with a canopy of old longleaf or slash pine is needed by the endangered red-cockaded woodpecker for survival.

Savannahs

--Savannahs are similar to pine flats in the diversity of the understory. No-one knows why they are treeless or nearly so.

--Frequent spring fires set this natural community aflame with a fashion show of color each week of spring, summer and fall!


--Among the first to bloom after a spring fire are the unusual carnivorous pitcher plants and butterworts, followed by showy pink and fringed orchids. "Meanwhile, ranks of pipeworts and white-eyed sedge, blue-eyed and yellow-eyed 'grasses', and meadow beauties are on parade. By summer's end...the spectacle is far from over. September and October bring on the composites" (Means 1990).

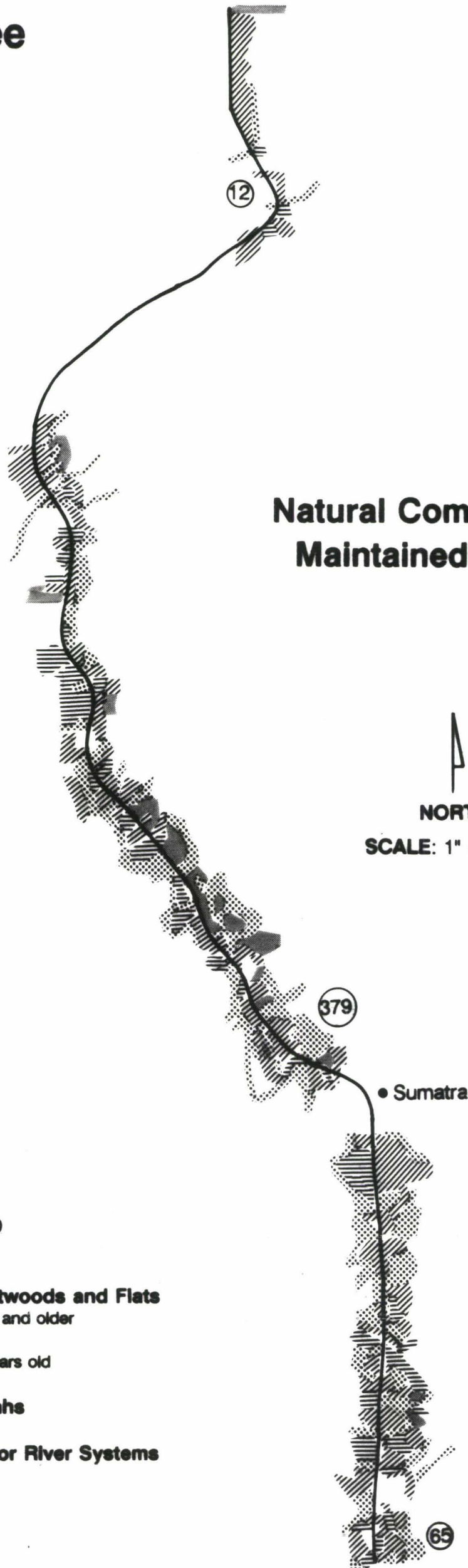


Apalachee Scenic Byway

Natural Communities Maintained by Fire

- LEGEND**
-  **Pine Flatwoods and Flats**
- 30 years and older
 -  - 0 - 30 years old
 -  **Savannahs**
 -  **Swamp or River Systems**

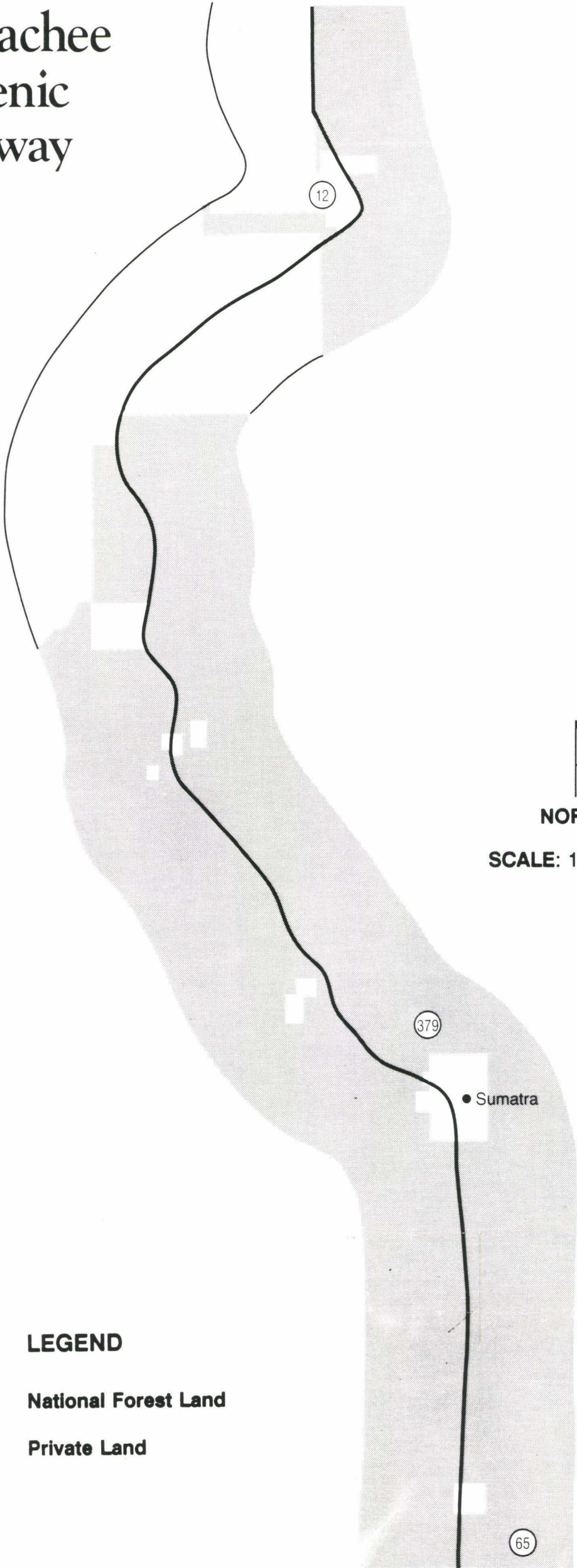

NORTH
SCALE: 1" = 2 miles



APPENDIX B

APALACHEE SCENIC BYWAY NATURAL COMMUNITY DESCRIPTIONS

Apalachee Scenic Byway



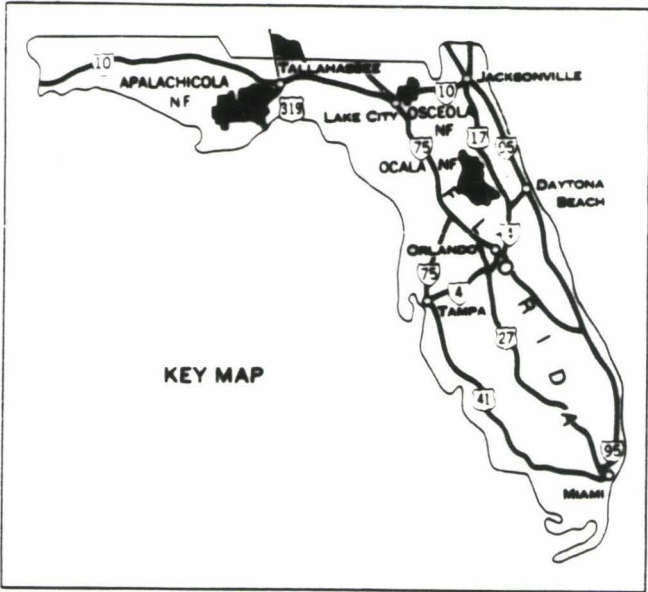
SCALE: 1" = 2 miles

LEGEND

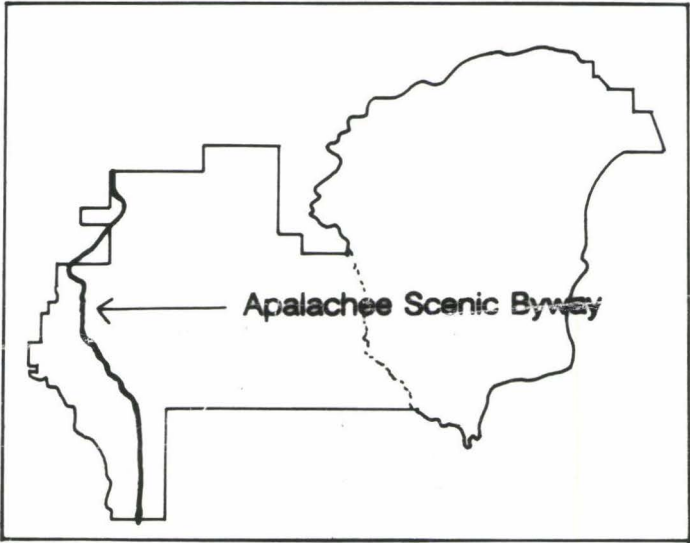
-  National Forest Land
-  Private Land

AREA AND VICINITY MAP

FLORIDA



APALACHICOLA NATIONAL FOREST



APPENDIX C

THUNDERSTORM ACTIVITY TABLE (FIGURE 1)

Yearly Distribution of Lightning Fires and Thunderstorm Days in Florida

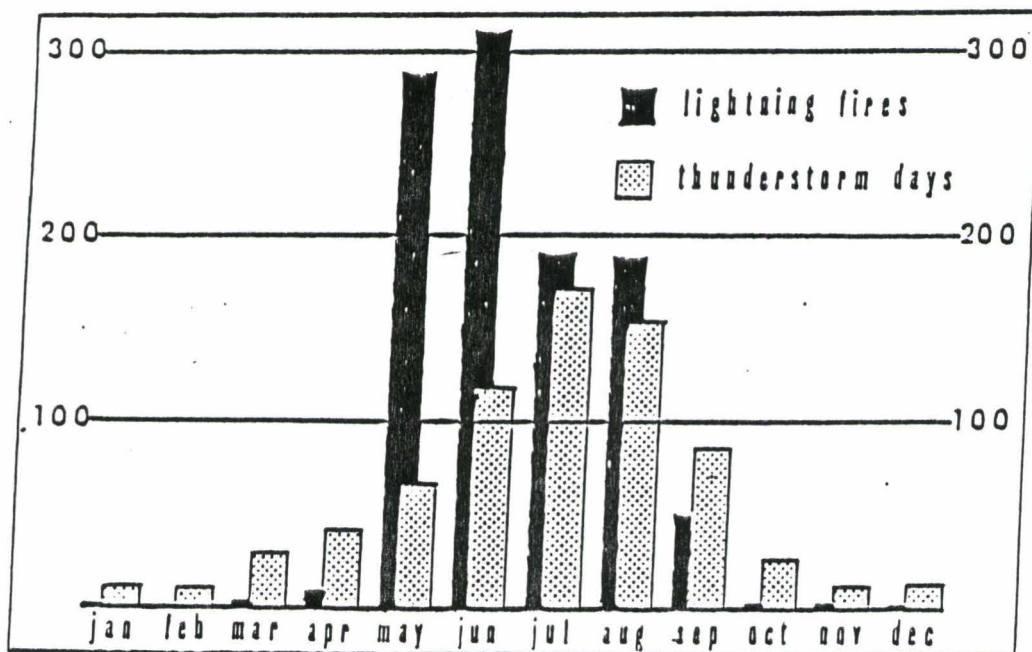


Figure 1. Yearly distribution of lightning fires and thunderstorm days in Florida. Numbers indicate totals for 1962 and 1963 combined. Lightning fires peak in May and June, while thunderstorm occurrence is greatest in July and August. From Komarek (1964).

APPENDIX D

FIRE KNOWLEDGE AND ACCEPTANCE TELEPHONE INTERVIEWS

Doglanders

Bud Burke - Pres. of Doglanders Assoc.

FIRE KNOWLEDGE AND ACCEPTANCE QUESTIONNAIRE

1. HOW DO YOU SPEND TIME ON THE NATIONAL FOREST?

Hunting, fishing

~~2. WHAT DO YOU THINK ABOUT PRESCRIBED FIRE OR WILDFIRE ON THE NATIONAL FOREST?~~

3. HOW DO YOU FEEL WHEN YOU SEE A FRESHLY BURNED AREA IN THE NATIONAL FOREST?

Ugly, but prescribed burning is necessary.

4. DO YOU THINK A BURNED AREA LOOKS BETTER OR WORSE THAN BEFORE THE FIRE
2 MONTHS AFTER A BURN? Better -

1 YEAR AFTER A BURN? Better - prettier

5. DO YOU THINK PRESCRIBED FIRE OR WILDFIRE IS BENEFICIAL OR DETRIMENTAL TO
THE ENVIRONMENT? Beneficial in our part of the country.
IN WHAT WAY?

- get rid of undergrowth
- new growth produces food for wildlife

6. DO YOU THINK PRESCRIBED FIRE OR WILDFIRE IS BENEFICIAL OR DETRIMENTAL TO
YOU WHEN YOU USE THE NATIONAL FOREST? Beneficial
IN WHAT WAY?

- my use is for hunting & it helps w/

7. WHY DO YOU THINK THE NATIONAL FOREST USES PRESCRIBED FIRE?

- clear away underbrush to prevent a large wildfire which would kill canopy trees as well as underbrush.

Gary Rankin - Logger

FIRE KNOWLEDGE AND ACCEPTANCE QUESTIONNAIRE

1. HOW DO YOU SPEND TIME ON THE NATIONAL FOREST?

Logging, Fishing, hunting, camping

~~2. WHAT DO YOU THINK ABOUT PRESCRIBED FIRE OR WILDFIRE ON THE NATIONAL FOREST?~~

3. HOW DO YOU FEEL WHEN YOU SEE A FRESHLY BURNED AREA IN THE NATIONAL FOREST?

Feel like the F.S. is managing the N.F.

4. DO YOU THINK A BURNED AREA LOOKS BETTER OR WORSE THAN BEFORE THE FIRE
2 MONTHS AFTER A BURN? Better

1 YEAR AFTER A BURN? Better

5. DO YOU THINK PRESCRIBED FIRE OR WILDFIRE IS BENEFICIAL OR DETRIMENTAL TO
THE ENVIRONMENT? Beneficial
IN WHAT WAY?

- Controls bugs, undesirable undergrowth
- makes the forest look cleaner

6. DO YOU THINK PRESCRIBED FIRE OR WILDFIRE IS BENEFICIAL OR DETRIMENTAL TO
YOU WHEN YOU USE THE NATIONAL FOREST? Beneficial
IN WHAT WAY?

- Less undergrowth to deal w/ (better access)

7. WHY DO YOU THINK THE NATIONAL FOREST USES PRESCRIBED FIRES?

- control bugs
- beauty
- get rid of undesirable undergrowth.

Debs White (FNAI & Native Plant Rep)

FIRE KNOWLEDGE AND ACCEPTANCE QUESTIONNAIRE

1. HOW DO YOU SPEND TIME ON THE NATIONAL FOREST?

looking at the flora. & hiking trails

~~2. WHAT DO YOU THINK ABOUT PRESCRIBED FIRE OR WILDFIRE ON THE NATIONAL FOREST?~~

3. HOW DO YOU FEEL WHEN YOU SEE A FRESHLY BURNED AREA IN THE NATIONAL FOREST?

welcome sight. I know it renews the system as long as there wasn't a lot of soil disturbance.

4. DO YOU THINK A BURNED AREA LOOKS BETTER OR WORSE THAN BEFORE THE FIRE 2 MONTHS AFTER A BURN? Better -

1 YEAR AFTER A BURN? Better

5. DO YOU THINK PRESCRIBED FIRE OR WILDFIRE IS BENEFICIAL OR DETRIMENTAL TO THE ENVIRONMENT? Beneficial
IN WHAT WAY?

- Renews the ecosystem
- provides nutrients needed for new growth
- stimulates blooming & regeneration
- provides open areas for seeding

6. DO YOU THINK PRESCRIBED FIRE OR WILDFIRE IS BENEFICIAL OR DETRIMENTAL TO YOU WHEN YOU USE THE NATIONAL FOREST? Beneficial
IN WHAT WAY?

- easier access
- ~~can~~ maintains diversity of flora, thus making it easier to study.
- Prettier - blooming

7. WHY DO YOU THINK THE NATIONAL FOREST USES PRESCRIBED FIRES?

- manage timber (burns to produce timber products, to eliminate competition, provides access for harvest, helps trees grow better).
- beneficial to the natural resource purposes

Irene Koonce

FIRE KNOWLEDGE AND ACCEPTANCE QUESTIONNAIRE

1. HOW DO YOU SPEND TIME ON THE NATIONAL FOREST?

Baiting,

~~2. WHAT DO YOU THINK ABOUT PRESCRIBED FIRE OR WILDFIRE ON THE NATIONAL FOREST?~~

3. HOW DO YOU FEEL WHEN YOU SEE A FRESHLY BURNED AREA IN THE NATIONAL FOREST?

Great! if there is good bait

4. DO YOU THINK A BURNED AREA LOOKS BETTER OR WORSE THAN BEFORE THE FIRE
2 MONTHS AFTER A BURN? Better

1 YEAR AFTER A BURN? Better

5. DO YOU THINK PRESCRIBED FIRE OR WILDFIRE IS BENEFICIAL OR DETRIMENTAL TO
THE ENVIRONMENT? Beneficial
IN WHAT WAY?

gives people jobs
helps animals - new grass
helps plants flower

6. DO YOU THINK PRESCRIBED FIRE OR WILDFIRE IS BENEFICIAL OR DETRIMENTAL TO
YOU WHEN YOU USE THE NATIONAL FOREST? helpful
IN WHAT WAY?

helpful if they can bait
harmful if baiters get blamed for arson.

7. WHY DO YOU THINK THE NATIONAL FOREST USES PRESCRIBED FIRES?

- helps the forest look pretty
- helps animals eat

Janet Owenby -

FIRE KNOWLEDGE AND ACCEPTANCE QUESTIONNAIRE

1. HOW DO YOU SPEND TIME ON THE NATIONAL FOREST?

Camping, biking, hiking, lounging at campground.

~~2. WHAT DO YOU THINK ABOUT PRESCRIBED FIRE OR WILDFIRE ON THE NATIONAL FOREST?~~

2. Do you know that the FS conducts controlled burning
yes.

3. HOW DO YOU FEEL WHEN YOU SEE A FRESHLY BURNED AREA IN THE NATIONAL FOREST?

Depends on how trees look after burning. If burned up I feel bad
carelessness - feels bad
if done scientifically it's ok.

4. DO YOU THINK A BURNED AREA LOOKS BETTER OR WORSE THAN BEFORE THE FIRE
2 MONTHS AFTER A BURN?

Better - looks pretty, esp. the flowering plants.

1 YEAR AFTER A BURN? Can't answer.

5. DO YOU THINK PRESCRIBED FIRE OR WILDFIRE IS BENEFICIAL OR DETRIMENTAL TO
THE ENVIRONMENT? Beneficial
IN WHAT WAY?

- burns undergrowth & gives other plants a chance to survive
- better for wildlife

6. DO YOU THINK PRESCRIBED FIRE OR WILDFIRE IS BENEFICIAL OR DETRIMENTAL TO
YOU WHEN YOU USE THE NATIONAL FOREST? Beneficial
IN WHAT WAY?

- Beauty & clears area

7. WHY DO YOU THINK THE NATIONAL FOREST USES PRESCRIBED FIRES?

- control undergrowth
- beauty - clears brush so you can see thru trees.

Marlene Culpepper - local resident

FIRE KNOWLEDGE AND ACCEPTANCE QUESTIONNAIRE

1. HOW DO YOU SPEND TIME ON THE NATIONAL FOREST?

Hiking, exploring, camping, swimming, hunting, fishing, horseback riding.

~~2. WHAT DO YOU THINK ABOUT PRESCRIBED FIRE OR WILDFIRE ON THE NATIONAL FOREST?~~

3. HOW DO YOU FEEL WHEN YOU SEE A FRESHLY BURNED AREA IN THE NATIONAL FOREST?

Doesn't bother me.

4. DO YOU THINK A BURNED AREA LOOKS BETTER OR WORSE THAN BEFORE THE FIRE 2 MONTHS AFTER A BURN? Looks worse

1 YEAR AFTER A BURN? Can't tell a difference - looks nice.

5. DO YOU THINK PRESCRIBED FIRE OR WILDFIRE IS BENEFICIAL OR DETRIMENTAL TO THE ENVIRONMENT? Beneficial
IN WHAT WAY?

Keeps down weeds. Maintains pine forest.

6. DO YOU THINK PRESCRIBED FIRE OR WILDFIRE IS BENEFICIAL OR DETRIMENTAL TO YOU WHEN YOU USE THE NATIONAL FOREST?
IN WHAT WAY?

Doesn't bother me because the forest is so large you can go somewhere else.

7. WHY DO YOU THINK THE NATIONAL FOREST USES PRESCRIBED FIRES?

- thinning
- not sure